American POTATO JOURNAL

Volume 26 *August, 1949* *Number 8*

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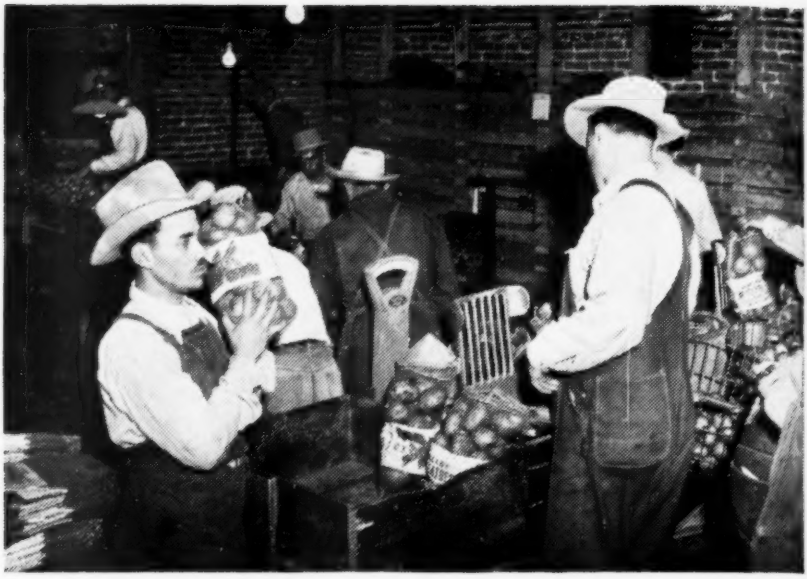

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NEW BRUNSWICK, N. J.

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Entered as second class matter at New Brunswick, N. J., March 14, 1942, under Act of March 3, 1879.

Accepted for mailing at special rate of postage provided for in section 412, Act of February 28, 1925, authorized on March 14, 1928.

SPROUT INHIBITION OF NON-DORMANT CHIPPEWA POTATOES

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(ACCEPTED FOR PUBLICATION JUNE 14, 1949)

Applying sprout inhibiting treatment to potatoes as they are removed from storage would reduce the expense of the treatment by eliminating treatment of those tubers disposed of before natural dormancy is broken. Since potatoes are often already beginning to sprout when they are removed from the storage in the spring, it is essential to know what materials and what concentrations are most effective in inhibiting the sprouting.

Since inhibition of sprouting of potato tubers by a gas, probably ethylene, given off by apples in storage was first reported by Elmer (4), much effort has been directed toward finding a practical method of preventing sprouting.

Guthrie (5) reported that cut pieces of non-dormant potato tubers were prevented from sprouting by soaking the bases of the pieces in solutions of neutralized indoleacetic acid. The following year Guthrie (6) obtained good sprout inhibition with the methyl ester of alpha-

naphthaleneacetic acid, the ester being sufficiently volatile at room temperature that it could be introduced into uncut tubers in the vapor form.

Denny (1) treated tubers shortly after harvest with methyl ester of alpha-naphthaleneacetic acid. Sprouting was completely inhibited for seven months. Untreated tubers sprouted freely. When methyl ester of alpha-napthaleneacetic acid was used in talc and dusted onto the tubers, 25 milligrams per kilogram were sufficient to inhibit sprouting.

Denny, *et al.* (2) found 1 to 1.3 kilograms of potato tubers were inhibited from sprouting completely for one year when exposed to filter paper impregnated with 400 milligrams of methyl ester of napthaleneacetic acd. When only 100 milligrams of this chemical were used on the same amount of tubers small sprouts appeared in six to eight months. Ten and thirty milligrams gave only negligible results. Delaying the application until six weeks after harvest resulted in a smaller amount of sprout growth at 15° C. than when the growth regulator was applied at once.

The results of Thomas and Riker (10) indicated that the methyl ester of alpha-napthaleneacetic acid was superior to any of the other substances used, and 0.2 per cent concentration gave almost as good results as 0.6 per cent. The only other material which inhibited sprouting to any marked degree was alpha-napthaleneacetic acid, but was markedly inferior to the methyl ester. Their results indicated that methyl ester of alpha-napthaleneacetic acid was equally effective when applied as a dust, or spray, but gave somewhat unsatisfactory results when applied as a vapor. Cobbler, Russel Rural, and Triumph treated with 0.4 per cent methyl ester of napthaleneacetic acid dust and stored for 40 days at above 70°F. were completely inhibited from sprouting. Sprouting on the Chippewa variety was not completely inhibited. Time of treatment studies indicated that with the variety Chippewa, fall treatment was less effective than treating just before warm weather was expected. They also recommended that applications of the chemical be made before the tubers break dormancy and begin to sprout.

Smith (8) reported 0.9 to 1.0 gram of methyl ester of alpha-napthaleneacetic acid per bushel of potatoes to inhibit sprouting when tubers were stored 4 to 5 months at 50° to 55°F.

Thayer (9) also found that methyl ester of naphthaleneacetic acid dust inhibited sprouting of potato tubers. The chemical was applied at the rate of 1 and 3 pounds of 2.2 per cent of methyl ester of naphthaleneacetic acid to eleven bushels of potatoes.

Pujals *et al.* (7) also were able to retard sprouting of tubers by application of methyl ester of alpha-naphthaleneacetic acid.

Materials and Methods

Indiana U. S. No. 1 washed Chippewa potatoes were weighed into twelve and one-half pound samples and allowed to stand at 50° to 60° F. from the 27th of February to the 12th of March, at which time treatments were applied. Sprouts were then one-half to one inch long. All sprouts were intentionally broken off in the process of applying the treatments. The sprouts on the potatoes which were untreated were also removed.

The growth-regulating materials used in this experiment were sodium salt of betanaphthoxyacetic acid, sodium salt of naphthaleneacetic acid, naphthaleneacetic acid, methyl ester of beta-naphthoxyacetic acid, and methyl ester of alpha-naphthaleneacetic acid. The experiment was so designed that the effects of three concentrations,—1, 3, and 9 grams per bushel as well as three methods of application,—(1) dusted, (2) dipped and dried at 70° F., and (3) dipped and dried at 135° F. were observed. All treatments were replicated four times.

Pyrax ABB talc was used as the carrier in the dust treatments. It was found that 15 grams of talc were necessary to cover 12.5 pounds of potatoes completely, an amount of dust approximately ten times that used for treating potatoes under commercial conditions. Each sprout inhibiting material was dissolved in five cubic centimeters of 95 per cent ethyl alcohol and dripped into the talc while being agitated in a Waring Blender. After mixing, the alcohol was allowed to evaporate and the dust reagitated to break up any lumps formed by the mixing process. The dust treatments were applied by putting the dust and tubers in a closed container and rolling gently.

The aqueous solutions for the dips were prepared by adding the chemical to 220 cubic centimeters of water. It was found that 12.5 pounds of potatoes removed approximately 220 cubic centimeters from the dip solution due to absorption and surface adhesion. In the case of naphthaleneacetic acid, it was necessary to dissolve the material in alcohol first and add the alcohol solution to the water. The tubers remained in the dip solution approximately three minutes. Upon removal from the dip they were placed in standard greenhouse flats lined with heavy paper. No additional treatment was given those dried at 70° F. Those dried at 135° F. were placed in a chamber and subjected to a thermostatically controlled air blast for twenty minutes. This temperature was based on that used in commercial dryers on potato washing equipment.

In applying the treatments caution was exercised to avoid contamination of the non-volatile materials by the volatile methyl ester materials. The treatment rooms had sufficient ventilation to evacuate rapidly any volatilization occurring from the esters. Other materials were either removed from the room or kept in air tight containers while a volatile material was being handled.

After treatment the tubers were removed to a large attic having adequate natural and forced ventilation. The two volatile ester materials were separated individually, and also from the non-volatile materials by thirty to thirty-five feet. Untreated samples and samples receiving talc only were randomized in each area with the treated ones. The treatments were randomized and stacked. A two-inch spacer was placed between each flat to allow air circulation over the tubers.

A recording thermograph was placed among the flats in each area. During the course of the experiment the most extreme variation in temperatures between the three areas was 0.9° C. No special effort, other than to avoid extreme temperatures by opening and closing windows occasionally, was made to maintain a specific room temperature. The average room temperature during the course of the experiment was 58° F.

On the 22d of April, after 40 days storage, the experiment was terminated. Sprouts were immediately removed from the tubers and the sprout weights and the tuber weights from the treatments recorded. Because of a high incidence of "rosette" type of sprouting, it was deemed impractical to make any attempt to measure sprout length.

Results

The results of this experiment are presented in table 1. None of the treatments resulted in complete inhibition of sprouting. Treatments were considered to have given satisfactory control only if their average sprout weight in grams did not exceed the average sprout weight of the best treatment by more than the amount required for significant differences at the 5 per cent level.

Effect of Different Hormones

Naphthaleneacetic acid and its sodium salt were the only materials used which gave satisfactory inhibition of sprout growth of non-dormant Chippewa potatoes. The methyl ester of alpha-naphthaleneacetic acid, although inhibiting sprout growth markedly, gave poor results when compared with the best treatment. The sodium salt and methyl ester of beta-naphthoxyacetic acid had no appreciable effect on sprout formation in this experiment.

TABLE 1.—*Average sprout weight and average tuber weight lost.*

Chemical	Method of Application	Ave. Sprout Wt., Grams			Ave. Tuber Wt. Lost, Lbs.		
		1 Gm./Bu.	3 Gm./Bu.	9 Gm./Bu.	1 Gm./Bu.	3 Gm./Bu.	9 Gm./Bu.
Sodium Salt of Beta-naphthoxyacetic Acid	Dip-dried 70°F.	203.7	198.5	206.3	2.6	2.8	2.7
	Dip-dried 135°F.	187.0	199.8	201.4	2.9	2.7	2.7
	Dusted	202.6	194.6	198.6	2.7	2.7	2.7
Sodium Salt of Naphthaleneacetic Acid	Dip-dried 70°F.	125.0	39.6	22.6	2.6	2.3	2.2
	Dip-dried 135°F.	109.3	77.2	48.9	2.2	2.4	2.3
	Dusted	96.2	29.8	18.3	2.6	2.3	2.3
Naphthaleneacetic Acid	Dip-dried 70°F.	99.2	52.4	14.5	2.5	2.4	2.5
	Dip-dried 135°F.	112.9	87.0	34.6	2.4	2.6	2.2
	Dusted	66.0	33.1	26.1	2.5	2.3	2.4
Methyl Ester of Beta-naphthoxy-acetic Acid	Dip-dried 70°F.	208.2	198.5	197.7	2.3	2.6	2.4
	Dip-dried 135°F.	201.8	201.1	207.0	3.1	2.6	2.6
	Dusted	204.5	192.6	187.8	2.9	3.2	3.3
Methyl Ester of Alpha-naphthalene-acetic Acid	Dip-dried 70°F.	164.3	134.2	115.4	2.6	2.9	2.7
	Dip-dried 135°F.	163.8	140.3	99.5	2.8	2.6	2.4
	Dusted	107.3	92.0	44.5	1.9	2.8	2.6
No Treatment (Check)			204.9			2.7	
Talc Only (Check)			205.3			2.8	
*L. S. D. 5 per cent			15.5			0.4	
L. S. D. 1 per cent			20.5			0.5	

*L. S. D. applies to differences between chemicals, methods of application, and concentrations.

EFFECT OF METHOD AND RATE OF APPLICATION

Although naphthaleneacetic acid, its sodium salt, and the methyl ester, applied at the rate of 1 and 3 grams per bushel of tubers, resulted in highly significant reduction in sprout weight as compared with tubers receiving no treatment, the sprouting was not sufficiently inhibited for satisfactory control. Likewise, 9 grams of these materials gave highly significant reduction in sprout weights, but only the 9 gram treatments with naphthaleneacetic acid and its sodium salt were judged to have given adequate control (Figures 1 and 2), and then only when applied in certain ways.

Of the five treatments considered to give relatively good control three were applied in talc and two as aqueous dips dried at 70° F. The sodium salt of naphthaleneacetic acid, applied at the rate of 9 grams per bushel, was equally effective in talc and aqueous solution when the tubers were dried at 70° F. Three grams of the sodium salt applied in dust

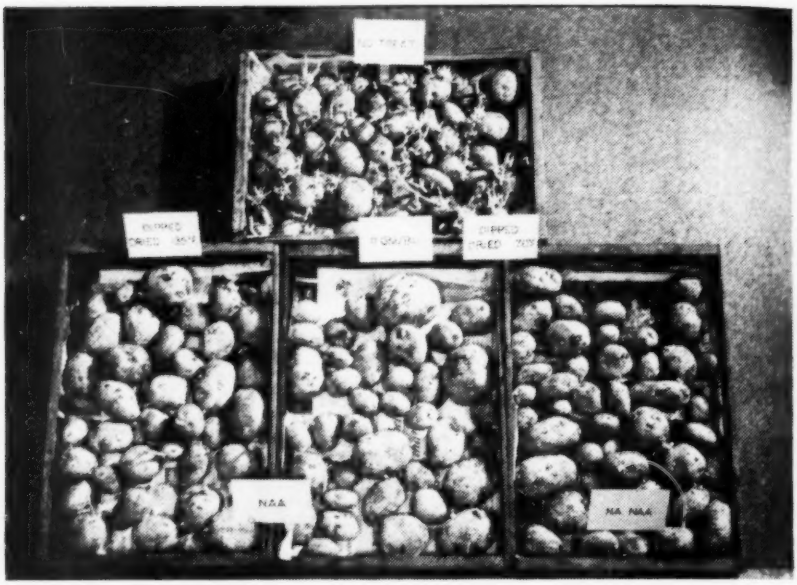

FIG. 1. The three dip treatments giving best control, all employed 9 grams of hormone per bushel of potatoes. The tubers in the two flats on the left were treated with naphthaleneacetic acid and those in the flat on the extreme right with the sodium salt of naphthaleneacetic acid. The tubers in the two flats on the right were dried at 70° F. and those in the one on the left at 135° F. Tubers in the flat at the top received no treatment.

control which was not significantly different from the best results obtained.

Naphthaleneacetic acid at the rate of 9 grams per bushel of tubers gave satisfactory control when applied as dust and as aqueous dip dried at 70° F.

All treatments applied as dips and dried at 135° F. resulted in significantly higher sprout weight than the treatment giving the best control.

There was a high correlation between average sprout weight and average tuber weight loss; the r^2 value being 0.83. Because of the extremely low humidity of the storage room all treatments lost considerable moisture and shriveled badly.

DISCUSSION

Even though sprouting was markedly decreased by certain hormones, complete inhibition was not achieved. These results are in accordance with the statement of Thomas and Riker (10) that hormone application should be made before tubers break dormancy and begin to sprout.

FIG. 2. The three best dust treatments were from left to right, Sodium Salt of Naphthaleneacetic acid, Napthaleneacetic acid and Methyl Ester of Alpha-Napthaleneacetic acid all applied at the rate of 9 grams in talc per bushel of potatoes. Tubers in the flat above received no treatment.

The good results obtained with naphthaleneacetic acid and its sodium salt as compared with the relatively poor results obtained with the methyl ester are surprising in view of the excellent results of other workers (1, 2, 6, 7, 8, 9, and 10) with the latter compound.

The effectiveness of the dip method is of importance inasmuch as it may be possible to treat potatoes by this method at the time they are washed, just prior to drying, thus combining operations to reduce handling costs. At all rates of application of naphthaleneacetic acid and its sodium salt the sprout growth was significantly less when the tubers were dried at 70° F. than when dried at 135° F. Since the latter temperature is often used to dry tubers after the washing process, a somewhat larger amount of material may be necessary to obtain good results under these conditions. With methyl ester of alpha-naphthaleneacetic acid there was no statistical difference in control between those dried at 70° F. and those dried at 135° F. when treated with 1 and 3 grams. However, when 9 grams of methyl ester were used, those tubers dried at 135° F. produced significantly less sprout growth than those dried at 70° F. indicating that perhaps the methyl ester of naphthaleneacetic acid would be more effective at higher temperature. Such results would be in accord with those of Pujals *et. al.* (7) who found methyl ester to be

more effective when the tubers were stored at 68° - 82° F. than at 50° - 55° F. This was believed to be due to the more rapid and complete vaporization of the material.

Summary and Conclusions

Indiana-grown washed Chippewa potato tubers which had broken dormancy were used in this experiment.

Methyl ester of alpha-naphthaleneacetic acid gave poor control of sprout growth, on potatoes which had already broken dormancy.

The sodium salt and methyl ester of beta-naphthoxyacetic acid gave no appreciable control of sprouting.

Naphthaleneacetic acid and its sodium salt at the rate of 9 grams per bushel gave satisfactory inhibition of sprouting when the treated tubers were stored for 40 days at an average temperature of 58° F. Treatments were equally effective where applied in talc, or in aqueous solution and dried at 70° F.

Drying dipped tubers at 135° F. significantly reduced the effect of naphthaleneacetic acid and its sodium salt at all concentrations used as compared with drying at 70° F. The same drying temperature, however, increased significantly the effect of methyl ester of naphthaleneacetic acid at the highest concentration used, as compared with drying at 70° F.

Treatment, after sprouts have elongated ½ to 1 inch, is probably not economically feasible since the dosage required is approximately 10 times that which is used to prevent sprouting of dormant potatoes.

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FIELD TESTS OF FUNGICIDE-INSECTICIDE COMBINATIONS IN MICHIGAN FOR 1948[1, 2]

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(Accepted for publication, Feb. 11, 1949)

Further field trials were made at the Lake City, Michigan, Experiment Station employing 22 spray and 12 dust combinations of fungicides and insecticides in control of early blight and various potato insects. The plots consisted of four rows randomized and replicated three times for the sprays and duplicated for the dusts. For the spray plots two harvestings were made and for the dust plots three harvestings were made for each plot. The spray plots were 150 feet and dust plots 250 feet in length. Both series of plots were planted to the Katahdin variety on the 17th of May and harvested between the 13th and 15th of September. The plots were irrigated five times during the period from the 26th of July to the 24th of August. Spray and dust applications were made at approximately 10-day intervals as follows: July 9, 19, 29, August 9, 19, 31, and September 7. Sprays were applied with a tractor drawn engine-powered sprayer at 300 pounds pressure and the dusts with an engine-powered machine of 50 pounds capacity drawn by tractor. A canvas 25 feet in length and covering four rows, trailed behind the duster to confine the materials to the vines.

No late blight was found in these plots but it was present as a trace amount in the main potato field across the field road. Early blight was first seen in the plots on the 3rd of August, but gained little headway until

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[1]Grateful acknowledgment is extended to all growers, commercial companies, county agents and experiment station workers who cooperated in this work. Especial gratitude is due Mr. A. M. Berridge, Supt., Lake City Experiment Station, for providing facilities for conducting this project, and to Mr. Dale Bray, graduate assistant in Entomology, for his assistance in making insect counts.

[2]Published by permission of the Director, Michigan Agricultural Experiment Station. Journal article number 1020 (n.s.).

[3]Research professor of Plant Pathology and Associate Professor of Entomology, respectively.

after the 24th when irrigation was discontinued and the vines were reaching maturity. Readings of early blight infection were made on the 17th and 24th of August and on the 13th of September just previous to harvesting.

Insect counts were made 2, 4, 6 and 8 days after each application of spray or dust from five complete sweeps including approximately 30 feet of row. Counts were made at ten-day intervals during the period from the 11th of July until the 9th of September inclusive.

Results of the spray materials tests are given in table 1 and show that the highest yield of U. S. number 1 potatoes was obtained from the plots sprayed with Zerlate + DDT (382.1 bu.) followed closely by zinc nitrodithioacetate (356.5 bu.), Dithane D-14 plus 50 W DDT, Parzate plus DDT and micronized cuprous oxide (Calumet and Hecla) plus DDT. The lowest yields were obtained with bordeaux mixture 8-4-100 plus DDT and Tribasic copper sulfate plus 1155, a mixture of 22.5 per cent DDT and 2.5 per cent chlordane used at the rate of 1 quart per 100 gallons. The results from the latter materials were not unexpected since there was some injury to the foliage after the first application of bordeaux mixture and later stunting of the vines and in 1947, chlordane used as a dust caused some wilting of the plants and a reduction in yield.

The table also shows that copper-zinc chromate gave best control of early blight followed closely by Zerlate, Dithane D-14, yellow cuprocide and cuprous oxide (Robertson Co.). Control of this disease seems to fall roughly into two classes, *viz*: Copper-zinc chromate and zinc-organic sulfur materials and (2) the inorganic copper materials with exceptions as mentioned above. The yield and control of early blight are not always closely related as shown by the plots sprayed with Parzate. Copper-zinc chromate and zinc nitrodithioacetate. In general, however, higher yields followed effective early blight control.

All of the insecticides tested gave practically 100 per cent control of flea beetles but there was considerable variation in effectiveness against common potato leafhopper, six-spotted leafhopper, spittle bug and aphids. The addition of chlordane to DDT was ineffective at the strength used in the control of spittle bug as was 25 per cent emulsion DDT and Parathion. This latter material, however, in combination with two fungicides gave perfect control of aphids, by far the best of all the materials used. Since none of these insects was present in great numbers at any time during the growing season, it is difficult to determine the true value of the insecticides employed, and only comparisons can be made.

Tests of dusts were also made with five different combinations of

TABLE 1.—*Insect and blight control on potato dust plots Lake City Experiment Station, 1948.*

Early	Yield*

TABLE 1.—*Insect and blight control on potato dust plots Lake City Experiment Station, 1948.*

Material and Dosage	Insect Control Percentage					Early Blight Per Cent Defoliation	Yield* U. S. No. 1 Bus. Per Acre
	Potato Leaf Hopper	Six-Spotted Leaf Hopper	Spittle Bug	Aphids	Potato Flea Beetle		
1. 629 + DDT (6 per cent Zn nitrodithioacetate + 5 per cent DDT)	76	48	44	93	100	48	242.3
2. TBC + Parathion (7 per cent Tribasic Cu + 1 per cent Parathion)	70	30	27	91	98	55	208.5
3. 629 + 308 + DDT (629 + Cu nitrodithioacetate (6 per cent) + 5 per cent DDT)	68	69	72	79	99	60	252.9
4. Parathion sp. + TBC (7 per cent cu + 1 per cent Parathion)	63	70	56	95	95	68	213.9
5. TBC + CM-155 (6 per cent cu, + 3 per cent DDT)	74	39	56	82	98	75	247.3
6. Zerlate + CME-1 (10 per cent Zerlate + 3 per cent DDT)	72	51	31	83	98	35	229.8
7. TBC + 602 (7 per cent cu + 3 per cent DDT)	66	64	50	90	100	63	190.2
8. TBC + 1156 (7 per cent cu + 3 per cent DDT + 1 per cent chlordane)	68	67	61	69	100	45	179.9
9. Z-78 + DDT (6 per cent Dithane Z-78 + 3 per cent DDT)	68	15	57	72	98	48	227.8
10. Y-cu + DDT (6.8 per cent yellow cuprocide + 3 per cent DDT)	74	51	50	72	100	55	193.1
11. DDT alone (3 per cent)	74	54	52	89	99	58	247.3

*Yield differences not significant at 5 per cent level.

insecticides and fungicides in 12 randomized duplicated plots. All dusts were ready mixed by the manufacturer to insure proper blending. Although space was lacking for more than duplicate plots, three harvestings of two 40-foot rows were made in each plot. Seven applications of dust were made on the same dates as the spray applications. Results of these tests are given in table 2. Because of soil variations there were no significant differences between yields. However, in early blight control Zerlate plus DDT was most effective followed by Tribasic copper sulfate plus 1155, Dithane Z-78 plus DDT, yellow cuprocide and Tribasic, both plus DDT. Highest yield was obtained in the plots dusted with copper-zinc nitrodithioacetate plus DDT followed closely by Tribasic copper sulfate, zinc nitrodithioacetate, Zerlate and Dithane Z-78 to all of which DDT was added as the insecticide.

Insect control in the dust plots (table 2) follows much the same pattern as in the spray plots. Aphid control on the whole was better with dusts than with sprays, with control of the older insects remaining about the same. Control of flea beetle with a combination of DDT and Chlordane was much better in the dust plots as compared with the same materials as a spray. Aphid control with Parathion remained high in the dust plots, and 5 per cent DDT also gave satisfactory control of this insect.

A second plot of mixed varieties was used in testing copper-zinc chromate (35 per cent early blight defoliation), compared with copper 8-quinolinolate (40 per cent) and DDT alone (70 per cent). The results with copper-zinc chromate dust are in keeping with those of the material as a spray. These materials were not included in the other series of dust plots because of lateness of arrival of materials. Only four applications of dust were made in these plots, and no insect counts nor yield records were made.

Summary

Further trials of combinations of fungicides and insecticides were made at the Lake City Experiment Station, using 22 sprays and 11 dusts. An average of 100 gallons of spray and 40 pounds of dust were used per acre at ten-day intervals.

All of the spray and dust combinations gave 95 to 100 per cent control of potato flea beetles. Control of aphids varied from 12 to 100 per cent in the spray plots and from 69 to 95 per cent in the dust plots. Although none of the materials gave 100 per cent of six-spotted leafhoppers, spittle bugs, tarnished plant bugs or potato leafhoppers, none of the mentioned insects nor the Colorado potato beetle presented

any serious problem during these tests. It is indicated that better control of the six-spotted leafhoppers was obtained with higher concentrations of DDT.

Early blight was first found on the 3rd of August; but was not present in serious amounts until the 24th. No late blight was present. In the spray plots, Copper zinc chromate, Zerlate, Yellow cuprocide, Dithane D-14, Cuprous oxide (H. H. Robertson Co.), were outstanding in early blight control. In the dust plots, Zerlate, Copper zinc chromate, Copper 8-quinolinolate, Tribasic copper sulfate, Dithane Z-78 and Zinc nitrodithioacetate gave very good early blight control.

There was no significant difference in yields from the dust plots In the spray plots, Zerlate, Zinc nitrodithioacetate, Dithane D-14, Parzate and Micronized cuprous oxide (C & H), ranked high in yields.

A second plot of mixed varieties was used in testing certain dust materials. Early blight readings showed that best control of this disease was obtained by the use of copper zinc chromate, 35 per cent defoliation, as compared with copper 8 quinolinolate 40 per cent, and DDT alone with 70 per cent. The results with copper zinc chromate dust are in keeping with those from the spray plots receiving this material as the fungicide.

EFFECT OF SOURCE OF POTASH IN THE FERTILIZER ON YIELD AND STARCH CONTENT OF POTATOES

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(Accepted for publication, Feb. 28, 1949)

Muriate and sulfate of potash are the most common forms in which potassium is supplied to crops from commercial fertilizers. Other less common forms include double sulfate of potash-magnesia, manure salts, potassium metaphosphate and potassium nitrate. The effects of these various chemical sources of potash, particularly of the muriate, or chloride, and sulfate on crop yield and quality have been investigated

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[1]Agronomist, Maine Agricultural Experiment Station. The author wishes to acknowledge the part J. A. Chucka, Arthur Hawkins, B. E. Brown, Stanley Junkins, Michael Goven and others had in the Maine experiments. Much of the work was in cooperation with the Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture.

Appreciation is extended to growers on whose farms the cooperative experiments were conducted.

extensively for many years. In fact, the literature on the effect of source of potash alone would fill a large volume.

No attempt is made here to review all of the literature on source of potash. Instead, the reader is referred to literature reviews by Hartwell (4), Schuster (7) and Sweetman (8).

As early as 1887 Scovell reported that in Kentucky the chloride source of potash produced slightly higher yields of potatoes than did the sulfate. A few years later Voorhees (1895) in New Jersey and Jenkins (1896) in Connecticut reported similar results. These and other investigators during this period either reported no difference in the effect of chloride and sulfate on the starch content of potato tubers or a higher content resulting from sulfate. Shiver (1901) also reported a reduction of starch in sweet potatoes fertilized with chloride, as compared with sulfate.

More research on the effect of source of potash on potatoes has been done in Germany than in any other country. Numerous papers have been published in European journals since about 1920. Results of these investigations invariably show that sulfate produces a higher starch content of the tubers than does chloride. Similar results have been reported from Great Britain. Houghland and Schricker (1933) concluded from work done in Virginia that potash fertilizer caused a slight depression in the starch content of the Irish Cobbler variety, which was greater for the chloride than for the sulfate source.

The starch content of potato tubers has been found by most investigators to be closely related to the dry matter content and fairly closely related to mealiness. Most people consider that mealiness constitutes high quality in cooked potatoes, other characteristics being satisfactory. A few, however, prefer potatoes to be somewhat waxy or "soggy" when cooked. Because of this difference in opinion, source of potash will be discussed only in relation to yield and starch content, leaving the matter of quality to be decided by the reader.

In much of the early experimental work on starch in potatoes actual determinations of starch were made. Some investigators estimated the starch content from the specific gravity of the tubers. In 1937 the German workers Von Scheele, Svensson and Rasmusson reported a very close relationship between the specific gravity of tubers and their starch and dry matter content. Since that time specific gravity, as determined by the Archimedes method of weighing the tubers in air and water or by immersing in brine solutions, has been largely used to calculate the starch content of potato tubers.

Source of Potash Experiments in Aroostook County

Effect of Source of Potash on Yields. The effect of the chemical source of potash in the fertilizer for potatoes has received considerable attention in Maine for many years. The possible effects on yield and quality were the two most important considerations.

Results as to the effect of chloride, sulfate and other sources on yield have been largely inconclusive. In some experiments and in some years slightly higher yields have resulted from the chloride. In others the sulfate has given slightly higher yields. As an average of all experiments conducted over the period of 1930-1944 and 1947-1948, the yields from the chloride and sulfate sources are practically the same. In experiments including the potassium nitrate or phosphate sources, their effect on yield was similar to that of the sulfate. Having part of the potash in the fertilizer as chloride and part as sulfate has usually resulted in yields intermediate between or similar to those obtained with either source alone.

The data in table 1, part of which is given in another publication (1), summarize experiments over the 1930-1944 period on fertility plots at Aroostook Farm, Presque Isle, Maine. In table 2 results from cooperative tests conducted in 1939-1941 are given. The Green Moun-

Table 1.—*Effect of chloride and sulfate sources of potash on Green Mountain potatoes,* 1930-1941.[1]

Year and Type of Rotation[2]	All from Chloride (KCl) Source	All from Sulfate (K_2SO_4) Source	Increase for Sulfate
Plots cropped every year to potatoes:			
Yield, Bus. per acre,			
1930-1936	364	364	0
1942-1944	428	404	-24
Plots in a potato, oats, clover rotation:			
1930-38,			
Yield, Bus. per acre	383	389	6
Starch content, per cent	16.1	17.8	1.7
Yield of starch, lbs. per acre	3700	4155	455
1939-44,			
Yield, Bus. per acre	384	381	-3

[1]The 1930-1941 data are taken from Chucka, *et al.* (1).

[2]Fertilizer was applied to all plots at the rate of 2,000 pounds of 4-8-7 in 1930-1938, and 4-8-8 in 1939-1944 per acre.

tain variety was grown in all of these tests except on the Easler Farm in 1940, where Katahdins were grown. The data in table 3 summarize the 1942 and 1943 experiments. Data presented are averages for the Chippewa, Green Mountain and Sebago varieties in 1942 and for the Green Mountain and Sebago varieties in 1943. Results from the 1939-1943 experiments for individual years are discussed in other publications (2).

In order to study the possible effect of source of potash on the need of potatoes for nitrogen in the fertilizer, rather extensive experiments were resumed in 1947 and 1948. With a potato planter now available with a specially designed fertilizer belt for applying small experimental lots of fertilizer accurately, it was thought that more consistent results might be obtained. Well replicated experiments in these years, however, failed to answer the question of effect of source of potash any more satisfactorily than had the previous experiments.

TABLE 2.—*Effect of source of potash on potato yields,* 1939-1941.

Year and Location of Tests	All from Chloride (KCl) Source	Yield—Bushels per Acre[1]		
		½ from Chloride, ½ from Sulfate	All from Sulfate (K_2SO_4 Source	⅓ Each from Chloride, Sulfate and Nitrate
1939 Tests:				
Blackstone Farm	378	375	363	375
Emery Farm	279	284	277	279
1940 Tests:				
Easler Farm	393	415	413	421
Fletcher Farm	323	342	364	338
1941 Tests:				
Duncan Farm	399	402	406	404
Fletcher Farm	330	356	340	352
Average, above 6 tests	350	362	360	362

[1]Yields for the ½ chloride and ½ sulfate treatment are for 2,000 pounds of 4-8-10 only; other yields are averages for 2,000 pounds of 4-8-8, 4-8-10, 4-8-12 and 4-8-16 per acre. Differences between potash sources were not significant.

In 1947 (9) sulfate of potash for the Green Mountain variety resulted in a significant increase of 34 bushels per acre over the chloride. For the Katahdin variety in the same experiment, there was no difference in yield between the two sources. (Table 4). In 2 other experiments in this year Katahdins yielded slightly higher with sulfate than chloride, but in 2 other experiments the reverse was true.

In 1948 both Green Mountains and Katahdins yielded slightly less

in an experiment with sulfate than with chloride. (Table 4). This was also true for Katahdins in a second experiment, but in a third chloride was slightly better. The average differences were not significant.

As an average for all experiments conducted, there is practically no difference in the yield of potatoes fertilized with chloride or sulfate of potash. As indicated above, results have not been very consistent and their explanation is not clear. No apparent consistent relationship between differences in yield from chloride and sulfate and the season, variety, previous crop, nitrogen fertilization or location can be detected in the yield data. In regard to the effect of season, Garner, *et al.* (3) found that fertilizing tobacco with muriate of potash materially increased the commercial value of the crop, as compared with sulfate, in drought years by increasing the water content of the leaf and making the crop more resistant to drought. This higher content of water in the foliage of potatoes fertilized with muriate has been noted in the Maine experiments, but its relationship to yield does not appear to be consistent.

Effect of Source of Potash on Starch Content. As contrasted to the variable effect of source of potash on yield of potatoes, as described in the previous section, muriate of potash has consistently resulted in a lower specific gravity and starch content of the tubers than have other sources.

Actual starch determinations were made on the Green Mountain potatoes grown on the fertility plots at Presque Isle from 1930-1938. As shown in table 1, the average increase in starch content from the sulfate compared with the chloride source of potash was 1.7 per cent. This amounted to an increase in yield of starch of 455 pounds per acre, an increase of approximately 12 per cent. The content of nitrogen in the tubers fertilized with sulfate was also slightly higher.

Starch content of the potatoes from experiments conducted in 1939-1941 and 1943 was not determined. In the 1942 experiments the starch content of the tubers was estimated from specific gravity determinations. As an average for the Chippewa, Green Mountain and Sebago varieties grown on 2 farms (Table 3), tubers grown with the sulfate source of potash contained 1.0 per cent more starch than those grown with chloride. The corresponding average increase in yield of starch was 200 pounds per acre, or slightly more than 6 per cent. The starch content of tubers grown with potash one-half from chloride and one-half from sulfate was intermediate. The content in tubers from plots fertilized with a combination of the nitrate and phosphate sources was similar to that in tubers from the sulfate plots.

TABLE 3.—*Effect of source of potash on potato yields and starch content, 1942-1943.*

Year and Location of Test,	All from Chloride (KCl) Source	½ from Chloride, ½ from Sulfate	All from Sulfate K_2SO_4 Source	Approx. ½ from Nitrate and ½ from Phosphate
1942 Tests:				
Cook Farm—				
Yield of tubers—Bus. per acre	531	533	533	536
Content of starch—per cent	11.9	12.5	12.7	12.7
Yield of starch—Lbs. per acre	3790	4000	4060	4080
Kitchen Farm—				
Yield of tubers—Bus. per acre	324	324	310	289
Content of starch—per cent	13.6	14.2	14.9	14.5
Yield of starch—Lbs. per acre	2640	2760	2770	2510
1943 test:				
Cook Farm—				
Yield—Bus. per acre	490	507	507	504
Ave. yield for above 3 tests—Bus. per acre	448	455	450	441

[1]Data are averages for 3 varieties in 1942 and 2 varieties in 1943. Fertilizer was applied to all plots at the rate of 2,000 pounds of 5-8-12 per acre. A yield difference of 22 bus. per acre was significant in the 1942 test on the Kitchen Farm. Other yield differences were not significant.

Results on Green Mountain and Katahdin varieties in 1947 and 1948 are similar to those obtained in 1942. As shown in table 4, the average increase in starch content of tubers from sulfate plots in 4 experiments was 1.0 per cent in 1947 and 1.1 per cent in 1948 compared with the tubers from chloride plots. Corresponding increases in the yield of starch were 350 and 295 pounds per acre, respectively.

The noticeably higher starch content of Green Mountain than of Katahdin tubers is also shown in table 4. The average difference in starch for both sources of potash on comparable plots amounted to 2.6 per cent in 1947 and 1.5 per cent in 1948. From these differences it may be seen that variety is a more important factor in starch content of potatoes than is source of potash. As an average of variety tests at 6 locations in Maine in 1948 (5), the starch content of the tubers, estimated from specific gravity determinations, was in the following decreasing order in the named varieties compared: Green Mountain, Mohawk, Irish Cobbler, Kennebec, Katahdin, Ontario and Chippewa.

TABLE 4.—*Effect of chloride and sulfate sources of potash on yield and starch content of potatoes*, 1947-1948.

Year and Location of Tests	Variety	Yield of Tubers—Bus. per Acre			Content of Starch—Per cent			Yield of Starch—Lbs. per Acre		
		Chloride Source	Sulfate Source	Increase for Sulfate	Chloride Source	Sulfate Source	Increase for Sulfate	Chloride Source	Sulfate Source	Increase for Sulfate
1947 tests:[1]										
Aroostook Farm—										
Annis field	Green Mt.	484	518	34	15.0	15.6	0.6	4365	4850	485
	Katahdin	512	512	0	12.2	13.2	1.0	3750	4055	305
Fertility plots	Katahdin	460	451	-9	13.4	14.6	1.2	3700	3950	250
Barnes Farm	Katahdin	470	486	16	—	—	—	—	—	—
English Farm	Katahdin	456	467	11	13.4	14.4	1.0	3665	4035	370
Griffin Farm	Katahdin	502	493	-9	—	—	—	—	—	—
Average for 1947		481	488	7	13.5	14.5	1.0	3870	4220	350
1948 tests:[2]										
Aroostook Farm—										
Fertility plots	Green Mt.	521	509	-12	15.6	17.4	1.8	4875	5315	440
	Katahdin	404	390	-14	14.4	15.6	1.2	3490	3650	160
Banks Farm	Katahdin	667	652	-15	12.8	13.8	1.0	5120	5400	280
Barnes Farm	Katahdin	612	621	9	13.0	13.6	0.6	4775	5065	290
Average for 1948		551	543	-8	14.0	15.1	1.1	4565	4860	295

[1]The 1947 values are averages for 2000 pounds of 4½-9-9, 6-9-9 and 7½-9-9 per acre.
[2]The 1948 values are averages for 2000 pounds of 4½-9-9, 4½-9-12, 6-9-9, 6-9-12, 7½-9-9 and 7½-9-12.

The cause of the lower starch content of a given variety fertilized with muriate than with sulfate of potash has been attributed by numerous investigators to the chlorine taken up by the potato plant. The effect of chlorine on the drought resistance of tobacco has been noted above, although fertilization of this crop with high rates of muriate usually results in poorer burn and a general reduction in the quality of smoking tobacco. Muriate of potash similarly causes a higher content of water in potato tubers and an accompanying lower content of starch and dry matter. The chloride content of potato foliage and tubers is also much higher when muriate is used.

As was true for the yield of potatoes in the Maine experiments, no consistent effect of the kind of season on starch content of the tubers, in relation to the source of potash, could be detected. Findlay (1928), however, observed that in Scotland fertilizing with sulfate of potash resulted in tubers of superior texture, as compared to chloride, especially in wet seasons or regions. Different varieties, with the same fertilizer treatment, tend to vary in starch content between locations and regions, and these variations are still largely without a satisfactory explanation.

Effect of Source of Potash on Tuber Discoloration. Certain varieties, especially Green Mountain and Irish Cobbler, are susceptible to a darkening of the stem-end portion of the tuber, known as stem-end browning. This browning was found by Ross, *et al.* (6) to occur in Green Mountain tubers fertilized with both muriate and sulfate of potash. The percentage of tubers affected, however, was considerably higher with chloride than with sulfate as the source. Recommendations to reduce the prevalence of stem-end browning in susceptible varieties include the use of fertilizer low in chloride and a reduction in the amount of potash applied, where such reduction does not cause lowered yields.

Summary

Experiments on the effect of source of potash in the fertilizer for potatoes were conducted in Aroostook County, Maine, over the period of 1930-1944 and 1947-1948.

As an average for all experiments muriate, or chloride, and sulfate of potash resulted in practically the same yield of tubers. In certain experiments and years the sulfate resulted in slightly higher yields, and in others the yields from chloride were slightly higher. In experiments where a difference resulted, yields from a combination of the phosphate and nitrate sources were similar to those from sulfate.

Sulfate of potash consistently resulted in higher starch content of

the tubers and a higher yield of starch per acre than did chloride. This difference ranged from 0.6 to 1.8 per cent starch and increases in yield of starch from approximately 200 to 450 pounds per acre.

The variety of potato was found to be a more important factor affecting starch content of the tubers than was the source of potash.

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METHODS FOR JUDGING FLAVOR AND ODOR OF COOKED POTATOES FROM SOILS TREATED FOR WIRE WORM CONTROL

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(ACCEPTED FOR PUBLICATION, MAY 2, 1949.)

With the introduction of new pesticides, reports are being received of undesirable flavors in vegetables grown in the treated soils. In cooperation with the Department of Entomology of the New York State College of Agriculture, the Departments of Food and Nutrition and of Institution Management of the New York State College of Home Economics at Cornell University have been testing odor and flavor, after cooking, of potatoes that have been grown on soils treated with chemicals having insecticidal properties. The effect of several methods of cooking is being studied. As this same problem is being encountered by entomologists in many parts of the country, a description of the procedures seems desirable. The choice of procedures was based on previous years of experience with potatoes and on preliminary tests, in the spring of 1948, of the odor and flavor, after cooking, of potatoes grown on soils treated for wireworm control.

SELECTION OF SAMPLES

For these studies, plots on which the control was high or complete were selected for sampling. This resulted usually, in samples from two or three plots each treated with a specified chemical at different levels of application. To test the possible effect of soil type as well as treatment, plots from each of two types of soil were also chosen for sampling. The samples were divided into two groups, each containing one check and six treated samples. The seven samples from one group were judged on the same day. This was about the maximum number that could be "handled" at one time, that is, prepared, served, and judged while hot, with available equipment and judges.

COOKING METHODS

The methods of cooking were chosen after consideration of the properties of the chemicals used for the soil treatments and of the practicality of the methods under home and institutional conditions. The final choice of methods comprised boiling in salted water, steaming at atmospheric pressure, steaming under 15 pounds pressure, baking, scal-

loping, and french frying. The initial preparation for each method, except baking, was the same. Sunburned or badly damaged potatoes were discarded.

Boiling. Three potatoes from each plot were pared, eyed and blemishes were cut out, and the pared potatoes were let stand in cold water until all lots were ready for cooking.

Only large potatoes were cut in half. Each lot was dropped into a two-quart saucepan containing two cups of boiling water and one-half teaspoon of salt. Each pan was covered and the water kept boiling until the potatoes were considered cooked when tested with a fork, usually about 40 minutes. The water was poured off, and the potatoes were broken up and well mixed with a wire potato masher. They were served in the pans in which they were cooked.

Steaming. Each lot of pared potatoes was dropped on a rack in a pressure saucepan containing two cups of boiling water and one-half teaspoon of salt. The pan was covered and the water kept boiling until the potatoes were considered cooked. Occasionally it was necessary to replenish the boiling water in the pans. A pressure saucepan used in this manner resembles a free-venting steamer. The cooked potatoes were mashed like the boiled ones and served in the pans in which they had been cooked.

For steaming under pressure, each lot of pared potatoes was dropped into a pressure saucepan containing one cup of boiling water and one-half teaspoon of salt. The lid was put on each pan, and the directions of the manufacturer were followed for the cooking of potatoes, allowance of time being made for the size of the potatoes. When cooked, the potatoes were mashed and served like the boiled ones.

Baking. Each potato was scrubbed and set on the table top until all were ready for cooking. Five lots of potatoes were baked in one oven and two (benzene hexachloride treatment) in another. To distinguish the different lots, a colored toothpick was inserted into each potato, a different color being used for each lot. The potatoes were baked in ovens at 425°F. until done as judged by testing with a fork. This usually took 50 to 60 minutes. The potatoes were cut into small pieces with scissors and served unsalted in heated glass dishes.

Scalloping. Pared potatoes were sliced crosswise with a slot peeler, each lot separately, and dropped into cold water until all lots were ready. The slices from each lot were thoroughly mixed and lifted out of the water, drained for a few minutes in a wire sieve, and then put into a one-quart glass casserole in layers alternating with a standard medium white sauce made with a bland fat. Enough sauce was used to cover the

potatoes. The same volume of sauce and the same quantity of potatoes were used for all lots. The potatoes were cooked in ovens at 350°F. until done, usually for one hour. They were served in the dishes in which they had been cooked.

French frying. The pared potatoes were cut into strips lengthwise by forcing them through a metal grid with holes one-half inch square. The strips of potatoes from each lot were put into a bowl of cold water until all were ready. They were then drained and dried on towels. For each lot of potatoes one pound of cooking fat was heated to 365°F. in a one-quart saucepan. The strips were dropped into the fat, about 20 at a time, and cooked until a light brown. They were drained on paper towels and served in hot glass casseroles. The judges were supplied with salt to shake over their samples as desired.

Judging Methods

The judging and the cooking were done in the same room. A service counter separated the judging area from the preparation area. Tables and chairs were provided. On the service counter were placed pencils and score sheets, dinner plates and forks, and all the samples to be judged. The pans or dishes in which the samples were served were numbered for identification. For all methods except french frying, numbered souffle cups were provided. For french fried potatoes, dinner plates were numbered around the rim. A self-service procedure was used, each judge taking from the counter a pencil, a score sheet, a fork, and an adequate amount of each sample. It was customary for the judges to test the odor of the potatoes in the service dishes because only small samples were taken for taste testing.

The score sheet was of the check type, and for each sample the judges were asked to check one of the following descriptive terms for both odor and flavor: natural; off-odor (or off-flavor)—weak, medium, strong. The judges were also asked to check whenever they considered the odor or flavor to be objectionable.

The group of judges consisted of faculty members, graduate students, and clerical employees from the three departments cooperating in the study. The judging was timed for 10:15 or 10:30 a. m. three days a week, and those of the group who were available constituted the panel of judges for the day. Consequently, the panel varied in composition and number from day to day. Little effort was made to prevent conversation, but each judge was asked to record his own unbiased opinion. No training was given and the identity of the check sample was unknown to the judges.

The order of presentation of the samples was changed from time to time but not in a truly random manner. Each group of samples included two from soils treated with benzene hexachloride. As experience had shown that such samples often imparted an after-taste that obscured the flavor of samples tasted shortly thereafter, benzene hexachloride samples were always given the highest numbers of the day and the judges were asked to taste the samples in numerical order.

The samples for each week's tests were brought into the laboratory either on Friday of the preceding week or on Monday of the same week. They were selected from the plot yields in storage by the professor of entomology in charge of the insecticide experiments. After receipt in the test kitchen they were stored in the vegetable compartment of a household refrigerator because no other low temperature storage facilities were conveniently available. The samples from plots treated with benzene hexachloride were stored in a separate refrigerator.

Discussion

The foregoing method of judging odor and flavor of cooked potatoes is debatable on several points. If, however, these are considered in relation to the procedure as a whole and to past experience, arguments can be advanced in their favor. Some of the points are:

Small number of potatoes used in each cooking lot. Practical experience with larger numbers of potatoes had led the experimenters to conclude that any off-odor or off-flavor due to soil treatments was to be found in all potatoes from a given treatment. Consequently the number was cut to that which could be handled conveniently within the general framework of the experiment.

Use of only approximate weights of potatoes in each sample. Use of accurately weighed amounts of potato would have necessitated trimming one or more of the potatoes or cutting the potatoes into small pieces and weighing a sample. The latter method was not used because it is not common home practice, and neither the former nor the latter method was used because the extra labor involved would not increase the accuracy of the experiment.

Use of only an unknown check sample. Some experiments with both a known and an unknown check sample showed that the ability of the judges to distinguish between natural and off-odors and flavors was not increased by the presence of a known check sample. To decrease labor and increase the number of treated samples that could be judged daily the check sample was limited to an unknown.

Conditions of judging. There is extensive literature on subjective

scoring of foods and the effect of variables such as environmental conditions, composition of judging panel, and training of judges. It is not pertinent to review this here. Some of the problems are discussed in the references listed. It is seldom pointed out that an experimenter frequently has to organize a panel of judges from volunteers who have other, and sometimes more pressing, calls on their time. It is often as important to maintain the interest and good will of the judges as to increase their efficiency in what is to them a minor activity. If a piece of work must be done, the worker uses the best skill and the most efficient tools at his command. This study was considered sufficiently important to warrant its procedure without delay under the best available conditions of judging.

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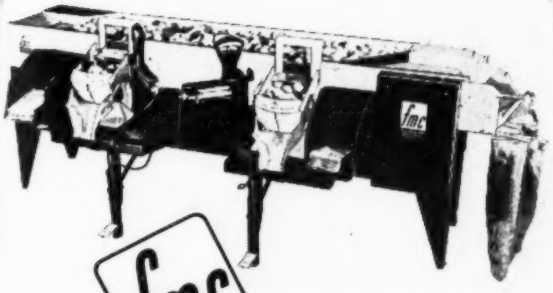

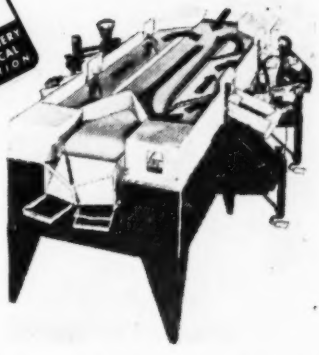

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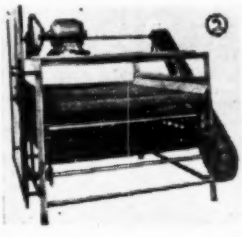
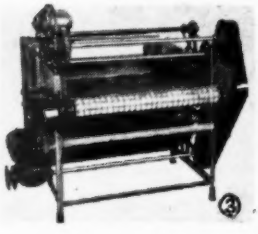
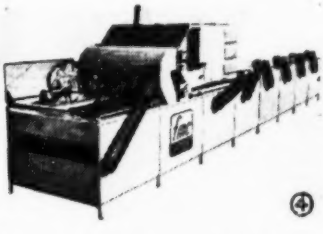
4. **fmc POTATO DRIER — Ideal for potatoes, onions and similar products. A fast, efficient and economical single-run unit that will meet the most exacting requirements.**







Other fmc potato processing equipment includes dump belts; trash, vine and dirt eliminators; trash disposal belts; cross conveyors; undersize belts; roller rinse washers; transverse washers; sizers; filling belts and hopper; roller grade tables; filling or sacking tables.

FOOD MACHINERY AND CHEMICAL CORPORATION
FLORIDA DIVISION . . . . . LAKELAND, FLORIDA

SECTIONAL NOTES

Indiana

With our reduced acreage in Indiana this year, we are finding that the yields are greatly increased over previous seasons because of our climatic conditions and also the absence of any blight damage. Our commercial harvest has always been on the upland soils, mainly Irish Cobblers. The size is very good, there is very, very little evidence of scab and practically all our growers are continuing to spray up until the time of harvest. The Early Cobblers appear to be running between 500 and 600 bushels of No. 1 Grade to the acre, with very few oversize potatoes. The market is taking the potatoes nearly as fast as they are harvested and the price is quite fair.

Our main crop, or late potatoes, is in excellent condition also. We have wonderful vine growth, no evidence of any disease or insect troubles and these growers are putting on a spray once a week to keep away any damaging or disastrous effects that may result in weather changes. We have a most promising outlook in Indiana and our growers seem quite happy regarding the situation. W. B. Ward.

Maine

Aroostook County has had an excellent growing season to date. Many people are remarking that we should have one of the best crops ever. The July estimate of 40 bushels per acre seems to bear this out. The August 10th estimate is eagerly awaited. E. L. Newdick, Chief of Bureau of Plant Industry, reports that the rejections under the certified seed program have been very small. No blight has appeared in any area of Aroostook County to date, which is most uncommon.

Aphids have made their appearance during the last week despite the fact that every one is using DDT. Many of the aphids apparently are potato aphids, which are more resistant to DDT than the other species.

Farmers are beginning to talk about early harvesting. Indications are that the roto beater and the roto cutter will be used to a large extent, although it is expected that several types of sprays will be used. Last year practically all of the methods of killing tops except the roto beater and cyanamid caused internal discoloration. Although it is apparent that this was a major factor in the fall, only a few lots would not pass U. S. inspection in the spring.

Every one is still looking for a satisfactory potato combine but as yet apparently none has been developed which can satisfactorily handle Aroostook's tops and rocks.—Verne C. Beverly.

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All Purpose...All Weather Farm Cutter

Rugged...Heavy Duty
It Controls Corn Borers
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cotton stalks
potato vines
grain stubbles
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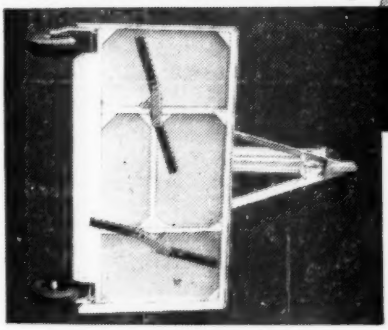

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A rugged, efficient, heavy duty cutter with oil sealed bearings and gear box, Wood's gives you years of trouble-free service. It conserves fertility of your soil, prevents erosion, adds humus, mulches topsoil, aids aeration.

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Nebraska

The next annual High Plains States Potato Workers' Conference will be held at Alliance and Scottsbluff, Nebraska, on the 9th and 10th of September. Headquarters for the meeting will be the Alliance Hotel, Alliance, Nebraska. This conference will be built around informal meetings at the hotel and the inspection of experimental work being conducted under dry-land conditions at the Box Butte Experiment farm and under irrigation at the Scott's Bluff Experiment Station. We plan to discuss problems involved in the release of new varieties, new developments in disease and insect control, the merits of vine killing and root-cutting with respect to late potatoes, foundation seed programs and the certification of seed potatoes. In the field extensive breeding and variety adaptation tests will be exhibited along with experiments concerned with the control of leaf roll disease and insects. Results obtained in scab tests, fertilizer and rotation experiments are also expected to be shown and should attract considerable interest. Although this is primarily a conference of workers from Colorado, Wyoming and Nebraska, many specialists from other states have been attending. We now wish to assure all potato workers regardless of where they live that they will be heartily welcome. Roscoe E. Hill.

New Jersey

The potato crop in New Jersey is approximately 25 per cent harvested. All the Cobblers and most of the Chippewas have been dug. Many growers are now harvesting their Katahdins. The yield of Cobblers was slightly higher than estimated on the first of July and many fields of Chippewas and Katahdins will yield 65 to 75 per cent of a normal crop. However, there are many fields that will not produce 50 per cent of a normal crop. Irrigated fields will produce from 2 to 3 times as many potatoes as our non-irrigated ones.

The excessive heat during June and July caused many tubers to sprout in the fields, and sprouts have formed on 25 to 75 per cent of the tubers, depending upon soil type and the use of irrigation. Most severe sprouting has been noted on the lighter soil types or on the gravelly knolls where soil temperatures became excessively high. Where irrigation water was applied early enough and continued at regular weekly intervals, there is less sprouting than in fields where irrigation was not started until the 10th or 15th of June or applied at 10 to 12-day intervals between applications. The sprouts range in length from 1/32" to 5" and numerous sprouts have emerged through the soil and established sturdy plants. Growers are doing an excellent

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Sprouting of potatoes in storage is no longer a problem with BARSPROUT, the remarkable inhibitor that keeps potatoes sprout-free! Their original freshness and firmness are preserved throughout months of storage, when there is no loss of weight caused by sprouting. Furthermore, you can store BARSPROUT-treated potatoes at temperatures which prevent accumulation of reducing sugars.

BARSPROUT costs little—a mere matter of pennies per bushel of potatoes treated. Yet it assures you better potato stocks, the kind that are preferred for table stock, chips or frozen packagings.

BARSPROUT, packaged in sizes to meet every commercial need, is available from your supplier.

Specific information on how BARSPROUT can help you will be promptly supplied. Please write stating the quantity of potatoes you store and the market you supply. There is no obligation.

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job of removing these sprouts at the grader. In most instances the quality of our crop is good.

A marked difference in the amount of sprouting in varieties was noted on the 5th of August when the writer and Dr. Henry A. Jones, Horticulturist at the U. S. Department of Agriculture, inspected a variety test at Cranbury. These differences will be observed carefully when the test is harvested. J. C. CAMPBELL.

NEW YORK

The acreage of certified seed in New York State is about the same as it was last year. Most varieties with the exception of two are maintaining their relative positions in regard to popularity. Chippewa has decreased 25 per cent in acreage and Essex has increased approximately 560 per cent. It now stands above Chippewa, Green Mountain, Irish Cobbler, and Ontario in popularity. This is one of the few new varieties that has been widely accepted throughout the state.

The weather has been and continues to be an important subject among potato growers. From my personal observations in upstate New York I don't believe that the dry season has been as much of a detriment as many believe. Of course, I don't expect yields to compare with last year's ideal conditions, but I do feel we will get fair yields.

Virous disease counts have been quite low through first inspection, and consequently very few yields have been rejected. JOHN MACABEE.

OREGON

The acreage of certified seed as applied for this year is 900 Russets and 450 White Rose. Because of the late spring frost the crop is very late, therefore the first field inspection was delayed. A long full growing season will improve the situation.—C. A. HENDERSON.

PROVINCE OF ONTARIO

The 1949 Prize List for the Royal Winter Fair, Toronto, Ontario, Canada, is now available. Copies may be secured free upon request to the above address.

Eight classes for seed potatoes are provided, and all varieties that are officially accepted under Potato Certification Regulations are eligible. Provision is made for thirty-one prizes in each class with first prizes up to thirty dollars in cash. A solid gold watch, donated by The American Potash Institute will be awarded to the exhibitor winning the Grand Championship. Ribbons will be provided for Championship and Reserve Championship exhibits. This major potato show will be held

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in the Colesium, Exhibition Park, Toronto, from the 15th to the 23rd of November.

In table stock potato classs, eight additional classes are listed, with eleven prizes in each class and twelve dollars as first prize in each case. The Championship will be fifty dollars in cash and Reserve Championship will be twenty-five dollars in cash, both donated by Gray-Snyder Company, Ltd., Hillsburg, Ontario, manufacturers of potato pickers. Thirty potatoes will constitute an entry in each class of seed or table stock, and trays are provided for exhibit purposes.

Although competition is open to the world, it is expected that all the Provinces in Canada, and many of the principal potato-producing areas of the United States will send a substantial number of exhibits. United States exhibitors should write Customs Department, Royal Agricultural Winter Fair, Toronto, Canada, for proper forms and shipping instructions to facilitate customs entries. It is important that intending exhibitors give this matter immediate attention in order that exhibits be admitted without collection of duties. Entries will close October 26, 1949.

The potato show at the Royal Winter Fair, has been enlarged during recent years and attracts much attention. It is now recognized as an outstanding display, not only from the standpoint of number of exhibits, but excellent quality. During the past two years, two well known potato authorities from the United States have served as judges in the persons of H. J. Evans, Manager, New York Seed Potato Growers Co-operative, Georgetown, N. Y., and Prof. E. V. Hardenburg of Cornell University, Ithaca, N. Y. Last year, exhibitors from Ontario won 136 prizes and the Grand Championship, whereas the Reserve Championship went to British Columbia. R. E. Goodin.

HUNGRY POTATOES

When potato plants are not getting enough potash, their leaves will have an unnatural, dark green color and become crinkled and somewhat thickened. Later on, the tips will become yellowed and scorched. This tipburn then will extend along the leaf margins and inward toward the midrib, usually curling the leaf downward and resulting in premature dying. Write us for additional information on the plant-food requirements of your crops.

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KANSAS CITY, MISSOURI

DECEMBER 7, 8, 9, 1949

HEADQUARTERS:
HOTEL PHILLIPS

Joint Meeting

with

International Crop Improvement Association

Thursday, December 8 in the Hotel President

Titles of papers for presentation at the meeting should reach Dr. Ora Smith, Cornell University, Ithaca, New York, by October 20, 1949. Abstracts of papers will be due November 15, 1949.

Room rates are as follows: $3.00 to $5.00 single; $5.00 to $8.00 double; $7.00 to $8.00 twins; $12.00 to $18.00 suites. The Hotel Phillips is located at 12th and Baltimore, 1½ blocks from the Hotel President. Make reservations early.